



**Joint Submission to the UNFCCC Secretariat on reducing emissions from
deforestation in developing countries**

by

**Centre for International Sustainable Development Law and Global Public
Policy Institute**

**A Carbon Stock Approach to Creating a Positive Incentive to Reduce
Emissions from Deforestation and Forest Degradation¹**

Steve Prior, Robert O'Sullivan,² Charlotte Streck

23 February 2007

Mandate

The Twelfth Session of the Conference of Parties to the UN Framework Convention on Climate Change (the “Convention”) invited Parties and accredited observers to submit to the secretariat, by 23 February 2007, their views on issues relating to reducing emissions from deforestation in developing countries, focusing on the discussion of ongoing and potential policy approaches and positive incentives, the technical and methodological requirements related to their implementation, the assessment of results and their reliability, and improving the understanding of reducing emissions from deforestation in developing countries. The Conference of the Parties (“COP”) invited Parties to also consider, as appropriate, relevant provisions in other conventions and the work of multilateral organizations.

¹ The authors would like to thank M. Estrada, S. Gregory, J. Niles, L. Pedroni and B. Schlamadinger for their comments and input on earlier versions.

² Corresponding author. Please send comments to r.osullivan@climatefocus.com.

The COP requested the Subsidiary Body for Scientific and Technological Advice to consider the information in the submissions, beginning at its twenty-sixth session (May 2007).

Summary

The Centre for International Sustainable Development Law (“CISDL”) and the Global Public Policy Institute (“GPPI”), as accredited observers, propose for further consideration and evaluation the Carbon Stock Approach described in this submission. The Carbon Stock Approach is a possible *positive incentive* to reduce emissions from deforestation and forest degradation. The approach extends the principles of a voluntary emission trading to forest carbon reserves in developing countries. The objective of the approach is to mobilize private sector funding for the protection of forests. It is an approach that promotes private and public participation on all levels (local, regional, international) while avoiding the need for project specific baselines. It allocates a finite number of carbon credits to participating countries that represent the tonnes of carbon stored in a country’s forestry resources in a base year. A portion of these forest resources are put into a reserve. The remaining areas outside the national reserve that are put under permanent protection or management will become eligible for generating credits that can be traded in the global carbon market. This creates a system which allows public and private entities in developing countries direct access to carbon finance if they establish protection systems over their forest resources. This approach may overcome a number of difficulties associated with a national baseline and credit mechanism that requires central oversight and coordination.

1. BACKGROUND AND ASSUMPTIONS

1.1 *Concept*

The objective of the Carbon Stock Approach is to design an incentive mechanism that reduces the deforestation and forest degradation in developing countries. The mechanism aims to include the private sector in the protection scheme by enabling private sector participation and creating tradable carbon credits. Private, market-based self interest will be harnessed for the broader public goods of mitigating climate change, protecting biodiversity and avoiding further degradation of soils. The mechanism

acknowledges that funds will have to be mobilized from the inception of the scheme to trigger the needed projects and measures.

The Carbon Stock Approach can be used in addition or as alternative to baseline and credit approaches. It has been developed to try and pose a solution to the following problems the authors see in approaches that rely on setting national baselines and traditional government-to-government cooperation:

- i) *Reliance on government oversight and management of national or regional incentives to reduce deforestation and forest degradation.* The forest administration and local forestry agencies are often characterized by weak governments, poorly enforced – and sometimes contradictory – policies and regulations, and corruption. It is therefore recommended to complement public policies with private action and set incentives for the protection of forest areas by private (and public) entities.
- ii) *Failure to allow direct participation in the carbon market by both public and private entities.* Allowing direct participation by the private sector provides two benefits. First, private sector participation is the best option to generate the significant amount of finance required and enable direct participation in host countries. Second, private participation also allows local stakeholders direct access to the benefits of the mechanism without the need to going through potentially weak government agencies.
- iii) *Failure of ex post crediting to generate financial incentives at the start of an activity, which is when it is needed most.* This has been observed in CDM LULUCF projects that rely on temporary crediting combined with ex post generation of credits under a baseline scenario.³

1.2 Assumptions

The Carbon Stock Approach is based on the following assumptions:

<i>Use of Market</i>	Market mechanisms which rely on the payment for
----------------------	---

³ Depending on the crediting mechanism chosen in the Carbon Stock Approach this problem may still persist. However, a possible crediting mechanism to overcome this problem has been identified and developed. See section 5.3 of the Annex for further discussion.

<i>Mechanisms</i>	environmental services are a promising tool to create sufficient financial transfers to motivate conservation of forests in developing countries. A mechanism which is built on emission trading and the transfer of carbon credits can help mobilize the necessary capital and investment flows into developing countries.
<i>Private sector participation</i>	Mobilizing resources from private sector entities is essential for an effective protection of the world’s forests. Traditional ODA financed protection measures have proven inefficient in the protection of the world’s forests and in the limitation of further GHG emissions from deforestation and forest degradation.
<i>Voluntary Participation</i>	Participation in emission trading should be an opportunity for developing countries rather than a constraint. Creating tradable emission reduction assets through voluntary participation de-links the achievement of an environmental benefit from the obligation to achieve such benefit.
<i>Real Financial Incentives</i>	The financial return of standing forests must be taken into consideration when making land use decisions. Any scheme should be able to provide real financial incentives to conserve forests over the long term. Carbon revenues can be weighed up against other choices, such as to log, convert to agriculture or to pasture. Issuance of credits for standing forests will also produce a greater up-front financial incentive to protect the forests.
<i>Inclusion of Degradation</i>	Emissions from forest degradation are an important source of emissions for a number of countries. For an incentive mechanism to be comprehensive, these emissions should be included. Degradation is also often the precursor to deforestation, reduces a forests ability to adapt to climate change, and reduces biodiversity, so reducing degradation will provide a number of other benefits that need to be taken into consideration.

<i>Internationally Accepted Methodologies</i>	The volume would be assessed using methodologies currently under development. ⁴ The accuracy and precision of the available data will have to be assessed. Additional costs for data collection should be supported by contributions from Annex I countries.
<i>Equitable Participation</i>	The scheme should enable the equitable participation of all countries – including small countries and those countries with historically low levels of deforestation and forest degradation. It should also avoid perverse incentives.

2. OVERVIEW OF THE CARBON STOCK APPROACH

The Carbon Stock Mechanism involves:

1. Calculating the amount of carbon stock that exists in a country’s forests;
2. Issuing credits representing the carbon stored in the above ground biomass of national forests;
3. Establishing a reserve over part of the national forest area;
4. Approving eligible projects that commit to protecting forest area outside the reserve (but included in the national forest stock) and periodically verifying the quantity of carbon stock being protected;
5. Issuing a corresponding amount of tradable credits to the approved projects. This involves either temporary crediting or permanent crediting. It is also linked with issues of permanence and protecting sovereignty.

A number of additional issues are also discussed including:

6. Participation criteria;
7. Force majeure;
8. Increases in carbon stock.

The following section provides an overview of the Carbon Stock Approach. A detailed description and discussion is contained in Annex I.

⁴ The IPCC’s guidelines are one possible example. See also the work of GOF-C-GOLD; <http://www.fao.org/gtos/gofc-gold>.

2.1 *Forest Assessment*

Countries that voluntarily choose to participate in the mechanism assess the above ground carbon stock within their forests⁵ on a particular date or over a particular period of time (the “Assigned Carbon Stock”). This assessment is reported to the UNFCCC Secretariat.

2.2 *Issuance of Non-Tradable credits*

Non-tradable carbon units – called “Carbon Stock Units”, are allocated by the Secretariat or the country on the basis of accounted carbon. Soil carbon is disregarded as it is difficult to accurately assess and is best protected by maintaining above-ground biomass. Disregarding soil carbon reduces the total number of credits and also ensures a conservative approach.

2.3 *Establishment of a Reserve*

Countries establish a reserve over a certain amount of their forest. In practice the size of the reserve will be negotiated by the countries participating in the mechanism either as part of the overall post 2012 negotiations or as a separate mechanism. The reserve should reflect those areas of forest that are not under existing or future threats of deforestation, and which the participating country does not aim to develop to further its own sustainable development. If part of the reserve is lost (for reasons other than force majeure) the host country would need to add additional forest areas to the reserve in an amount that would over-compensate for the loss within the reserve. The reserve volume may or may not be re-negotiated over successive commitment periods. Determining how much is set aside as a reserve, and determining where to establish the reserve will be difficult. However, it is not expected to be more difficult than estimating a national baseline or negotiating a quantified emission limitation and reduction commitment for Annex I Parties.

2.4 *Participation in the Trading Mechanism*

A trading mechanism (the “Carbon Stock Mechanism” or “CSM”) is defined. To be eligible to trade the amount of stock held in the reserve needs to be maintained. The Carbon Stock Units corresponding to the biomass stored in the forest of the core area are

⁵ See below for a discussion of what would qualify as “forest”.

not eligible for trading. The carbon stock in forest outside the reserve is by definition threatened by deforestation or degradation in the future and eligible for trading.

2.5 *Protection Activities and Issuance of Credits*

Countries and authorized private entities can propose areas of forest outside the reserve that they agree to permanently protect or sustainably manage. A conservation and management plan is approved by the host country and an independent body. The standing stock within the protected area is assessed more accurately than under the national assessment and the host country converts some of its Carbon Stock Units that are outside the reserve into tradable credits. Tradable credits can be issued for these areas on a one-time or (preferably) renewable basis. The protected area is periodically assessed to ensure permanence.

Renewable or temporary crediting will safeguard against loss of permanence and ensure a sustainable income for participating entities. The reduced price received by project sponsors for temporary credits will be offset by the increased volume of credits available compared to a baseline and credit scenario and the timing of their availability⁶ – two key hurdles in CDM LULUCF projects. An ability to have temporary credits re-issued indefinitely rather than replaced at some arbitrary point in the future will also increase the appeal of the credits and overcome the current perverse incentive in the CDM to harvest a forest once the carbon credits can no longer be issued.

2.6 *Participation Criteria*

Participation is voluntary. However, to be eligible to participate in the mechanism a country will have to put in place the necessary infrastructure. This infrastructure includes assessing the carbon stock, defining the core area of forest that is not eligible for trading, designating a national authority to approve projects⁷, and establishing a registry system that can record issuance and transfer of Carbon Stock Units and be linked into the International Transaction Log. Annex I countries are called upon to support the development of the necessary infrastructure.

⁶ See the discussion in paragraph 5.3 of the Annex on possible problems with up-front crediting and some suggested solutions.

⁷ For convenience this could be the DNA established for CDM projects.

If a country fails to maintain the agreed amount of reserve carbon or compliance with the participation criteria, the country will not longer be eligible to approve new projects. Existing projects already approved should still be able to have its carbon stock re-verified as individual projects or communities that are performing as planned should not be penalized by events in another part of the country outside of their control.

2.7 *Force Majeure*

Forests are often subject to threats outside of the control of a country, such as accidental fires, cyclones, flooding, and changing weather patterns. The loss of carbon due to these types of force majeure events should not prevent a country from meeting its commitments to maintain the reserve. If a country loses part of its reserve due to a force majeure event, projects should not “punished” by being prohibited from participating in the mechanism or receiving credits from their projects if they are performing.

2.8 *Increases in Carbon Stock*

Increases in carbon stock – both within the reserve and within individual projects are likely to occur. While it may be possible to issue new credits for additional carbon sequestered, we suggest that any increases in carbon within the Carbon Stock Mechanism should be excluded from the mechanism. This serves two purposes. First, a mechanism that allows for a net *increase* in units is different to the proposed approach. It also ensures the mechanism does not compete in any way with afforestation and reforestation under the CDM, or any modified version of the CDM that may include forest restoration projects. Second, discounting the net increase in carbon underlines the conservativeness of the mechanism. Including increases in stock could be reviewed in the future after the mechanism has been tested and any problems with its efficacy have been identified.

3. **COMPARISONS WITH OTHER MECHANISMS**

Table 2 compares the Carbon Stock Approach with the national baseline and credit concept and the CDM. A generic national baseline and credit system was used for the purposes of comparison. The authors recognize that details of specific approaches may differ from the details represented below.

LULUCF activities under the CDM are also included in the table to highlight the differences between the national project based approach of the Carbon Stock Approach and the purely project based CDM. The CDM and the proposed Carbon Stock Mechanism would complement each other as CDM projects can be implemented outside of the boundaries of the accounted carbon stock areas and can promote afforestation and reforestation activities.

The Carbon Stock Approach can also be extended to CDM afforestation and reforestation projects once their crediting period has expired. After the crediting period of a LULUC CDM project expires, the projects can be eligible to receive credits under the Carbon Reserve Mechanism. This will ensure the financial incentive to preserve the forest is maintained, which will overcome the perverse incentive created by the current CDM rules to harvest a CDM forest as soon as it is no longer eligible to generate CERs.

Table 2: A comparison of different mechanisms

Carbon Stock Approach	National Baseline and Credit	Clean Development Mechanism
<i>Establishing the Mechanism</i>		
Based on assessing total above ground carbon within a country's forests and setting aside a reserve. Reserve will be difficult to agree upon and in effect is similar to a future baseline assessment at a future point in time. Determining the geographic location of the reserve will also be difficult.	Requires the assessment of national deforestation and forest degradation rates, either historical and/or projected. The establishment of a national baseline will be difficult. Taking into account the occurrence of unplanned and illegal logging activities in many forests, exact data to determine a deforestation baseline are hard to obtain. Historical deforestation baselines also reward high deforestation rates.	CDM already established but reducing emissions from deforestation or forest degradation are not eligible to generate credits. Project specific baselines are not adequate for projects that avoid further deforestation. Not only will it be difficult to determine the baseline of a particular activity; for most avoided deforestation activities it will also be difficult to define project boundaries, avoid and quantify leakage, determine title to carbon credits, monitor the emission reduction, and not to reward illegal activities.
Combined national and project specific approach plus an international mechanism.	National approach plus an international mechanism.	Project specific approach plus an international mechanism.
Other than to assess a country's carbon stock at the reference year or a reference period, the approach does not rely on availability of historical data or historic changes in forest cover.	Historic data used to establish the baseline may be difficult to obtain or may not exist.	Eligibility requires historic data. Project specific baselines are required.

<p>Assessment at a base year or base period gives an accurate start date for the mechanism.</p> <p>Agreeing on a base year or period will be subject to negotiations and may be difficult.</p>	<p>Historic deforestation rates will always be behind current pressures and will need to be adjusted to take into account future rates.</p>	<p>Historic deforestation rates will always be behind current pressures and will need to be adjusted to take into account future rates.</p>
<p>Countries with low historic rates of deforestation and degradation are not penalized as future deforestation rates and development objectives are considered when establishing the reserve.</p>	<p>Countries with low historic rates of deforestation and degradation are penalized unless a purely historic baseline is adjusted to consider future deforestation rates.</p>	<p>Eligibility tied to status of land in 1990.</p>
<p>Does not create a perverse incentive to deforest to artificially inflate baseline, but creates a strong incentive to over-estimate future deforestation.</p>	<p>Needs to be carefully designed to eliminate perverse incentive to increase deforestation to inflate a historic baseline.</p>	
<i>Implementation</i>		
<p>Allows decentralized implementation by private and public entities, including local and international private entities as well as local communities. Government involvement is still required in project approval.</p>	<p>Top down implementation requires careful planning and implementation by the government.</p>	<p>Allows decentralized implementation by private and public entities, including local and international private entities as well as local communities. Government involvement is still required in project approval.</p>
<p>Sufficient government resources needed to assess national forest carbon stock, establish and protect the reserve. Individual projects are monitored and protected by project sponsors.</p>	<p>Government is required to have sufficient technical capacity and resources to effectively develop and implement national projects or programs to reduce deforestation in anticipation of future payments. National projects may need to be tailored to address local issues.</p>	<p>Project sponsors need sufficient resources to implement projects in advance of credits being generated. High transaction costs, and long lead times in generating credits acts as a barrier for many projects.</p>
<p>Individual projects can be tailored to address local pressures. National approach prevents national leakage.</p>	<p>May be possible to have regional policies.</p>	<p>Individual project can be tailored to local environments. Not a national approach so leakage would be an issue if extended to REDD projects.</p>
<p>Payments made directly to private or public sector project sponsors.</p>	<p>Central government receives funds and is responsible for the implementation of protection programs.</p>	<p>Payments made directly to private or public sector project sponsors.</p>
<i>Economic Efficacy</i>		
<p>Depending on the crediting</p>	<p>Credits created and available for</p>	<p>Credits created and available for</p>

mechanism, credits are created and available for sale when the protected area is established.	sale after the project or program is established and a period of time has elapsed.	sale after the project or program is established and a period of time has elapsed.
Income generated from sale of credits from the start of the project can be used to finance the project.	Policies and incentives require independent funding when project start, or advanced payments for un-generated credits at a discount.	Projects require independent funding when started, or advanced payments for un-generated credits at a discount.
Volume and price risks minimized as a known volume will be issued at the start of the project at current prices. Risk of loss in cases of non-permanence. Depending on the crediting mechanism chosen, credits can be sold under forward contracts at known prices at a discount. ⁸	Volume of credits unknown at start of a national project. Prices received when credits are generated will be hard to predict. Credits can be sold under forward contracts at known prices at a discount. ⁸	Volume of credits unknown at start of a national project. Prices received when credits are generated will be hard to predict. Credits can be sold under forward contracts at known prices at a discount. ⁸
Potential to flood the market and compete with domestic reductions (and CDM and JI) unless restrictions are placed on volumes or demand for credits is significantly increased (e.g. by tougher Annex I targets).	Potential to flood the market and compete with CDM and JI unless restrictions are placed on volumes or demand for credits is significantly increased. However, market control easier as the market is limited to government to government transactions.	Fear that credits would flood the market have not been realized. Caps on credit volumes have not been met.
Long term stream of credits and income is less certain if permanent crediting adopted. (Not recommended) With temporary crediting the credits will be re-issued and available for re-sale periodically which will create a stream of income over the long term.	Long term stream of credits and income is less certain if permanent crediting adopted. With temporary crediting the credits will be re-issued and available for re-sale periodically which will create a stream of income over the long term.	With temporary crediting the credits will be re-issued and available for re-sale periodically which will create a stream of income over the long term. Permanent crediting not an option.
Temporary credits will be re-issued indefinitely as long as the protected forest remains intact.	Temporary credits can be re-issued indefinitely as long as the protected forest remains intact.	Perverse incentive to cut down the forest once the project crediting period ends as temporary credits can not be re-verified or re-issued indefinitely.
Central government only responsible for periodically assessing carbon stock within the reserve. Assessment of carbon stock within a project outside the reserve is the	Central government responsible for periodic national assessment of forest coverage.	Project sponsors responsible for assessing carbon within the project boundary. Independent verification.

⁸ The size of the discount will be a function of perceived delivery risks. Current discounts for forward purchases of CDM credits have been known to range up to 60%.

responsibility of the project sponsors/independent verifiers.		
<i>Environmental Integrity</i>		
Advanced crediting as potential to generate “temporary hot air” if forest is lost soon after issuance of credits. This can be mitigated by excluding soil carbon to ensure conservative issuance of credits, and can be further mitigated by requiring a portion of issued credits to be banked until a history of protection has been established. Temporary hot air may also be seen to be generated where stock credits are used for compliance, but the underlying forest may not have been lost until some point in the future. ⁹	No hot air at issuance as crediting based on ex-post assessments against a baseline. “Hot air” may be created if actual business as usual deforestation rates are lower than the baseline.	No hot air at issuance as crediting based on ex-post assessments against a baseline.
Temporary crediting ensures lost carbon stock is accounted for in subsequent verifications.	A portion of credits can be banked as insurance against future losses if permanent crediting adopted. Temporary crediting ensures lost carbon stock is accounted for in subsequent verifications.	Temporary crediting ensures lost carbon stock is accounted for in subsequent verifications.
Temporary crediting will ensure continued payments over the long term.	If deforestation rates are reduced and flatten over time, under a permanent crediting mechanism credit volumes will be reduced over time as will incentives to reduce deforestation. Temporary crediting will ensure continued payments over the long term.	Temporary crediting will ensure continued payments over the long term until the end of the crediting period at which point there is a perverse incentive to cut the forest.

It is worth comparing the practical effect of the Carbon Stock Approach with a baseline and credit approach using the following hypothetical example:

In 2000 country A assesses its forests and calculates it has 100 million tonnes CO₂e stored as carbon. It also estimates that based on future deforestation rates and its development objectives it will have 50 million tCO₂e in 2025 and this amount is put into a reserve. The forest corresponding to the 50 million tCO₂e outside the reserve will

⁹ See section 5.3 of the Annex for mitigation options.

therefore be eligible for protecting under individual projects and receiving tradable credits. Comparing to a national baseline and credit scenario, if deforested in a business as usual scenario this area outside the reserve will also be deforested by 2025. If in 2025 as a result of a positive incentive mechanism there are in fact 70 million tCO₂e stored in the countries forests, under both the Carbon Stock Approach and a baseline and credit approach 20 million credits would be issued.

The main difference between the two approaches are 1) who implements the incentive to reduce deforestation and forest degradation, 2) who is able to participate in the mechanism, and 3) the timing of credit issuance and payments.

ANNEX I

THE CARBON STOCK APPROACH: A DETAILED EXPLANATION

The Carbon Stock Mechanism involves:

1. Calculating the amount of carbon stock that exists in a country's forests;
2. Issuing credits representing the carbon stored in the above ground biomass of national forests;
3. Establishing a reserve over part of the national forest area;
4. Approving eligible projects that commit to protecting forest area outside the reserve (but included in the national forest stock) and periodically verifying the quantity of carbon stock being protected;
5. Issuing a corresponding amount of tradable credits to the approved projects. This involves either temporary crediting or permanent crediting. It is also linked with issues of permanence and protecting sovereignty.

A number of additional issues are also discussed including:

6. Participation criteria;
7. Force majeure;
8. Increases in carbon stock.

1. Calculating the amount of carbon stock

The Parties agree on parameters for a “forest” definition for the purposes of undertaking a carbon stock assessment. The individual Parties nominate their own definition of forest within these parameters for the purposes of calculating the amount of carbon stock included in their national assessment. The parameters should be defined with the costs required to accurately and precisely measure the carbon stock in mind.

Each country is responsible for undertaking an assessment of its carbon stock based on their chosen definition. The assessment is undertaken using common, internationally approved methodologies.¹⁰ The assessment would be conducted for a specific year or an average over a number of years. It is expected that financial and technical support from

¹⁰ Tier 1 within the IPCC Good Practice Guidelines may be sufficient for the national assessment, with more rigorous accounting encouraged if it is within a countries means.

Annex I countries will be needed at least for the initial assessment in a number of participating non-Annex I countries.

Estimates of carbon stock will need to be fair but conservative, and it is suggested that this conservatism could be provided by only estimating the carbon stocks in the above-ground biomass. However, it should be noted that too conservative an estimate of above-ground biomass may i) result in countries underselling their efforts and ii) produce insufficient credits to create a sufficient incentive to avoid deforestation.

2. Issuing credits

The UNFCCC Secretariat or participating Parties issue an amount of non-tradable carbon stock credits that correspond to their accounted forestry resources. We will refer to the allocation as Assigned Carbon Stock and the units created as Carbon Stock Units.¹¹ As with the existing Kyoto mechanisms, the allocated credits would be accounted for in units of tonnes of CO₂e.

The advantage of issuing credits under a stock based methodology is that the total amount of carbon currently held in a country's forests at a certain time can be estimated with a sufficient degree of accuracy using known forest inventory, satellite photography and statistical methods.

3. Setting aside the reserve

A country that wishes to participate in trading Carbon Stock Units would have to hold a certain percentage of its carbon stock constant as a "carbon reserve". The reserve would correspond to particular areas of land for a particular period of time. The reserve and associated areas of land would be re-assessed periodically and if an area of forest within the reserve is lost an additional area of forest will need to be added that should overcompensate for the lost area. As a result, the physical location of the forests that form part of the reserve may change over time.¹²

¹¹ We see the problem of the proliferation of carbon units. However, the rules governing the Carbon Stock Units will differ significantly from the existing AAUs, RMU, or CERs. We therefore consider yet another term necessary.

¹² For example, if government needs to develop a parcel of land within an area previously demarcated as within the reserve, it would be required to set aside an equivalent area of forest plus an additional amount in another location to compensate for the loss within the reserve. Equivalency in forest type would need to be taken into consideration to ensure old growth or rare ecosystems are not "replaced" by plantations of exotic species.

In return for establishing the reserve, participating countries are eligible to sell the Carbon Stock Units associated with forests outside the defined “carbon reserve”. Setting aside carbon reserves also avoids “hot air” credits from forests which are not threatened by deforestation or degradation. This prevents carbon credits with no clear long term atmospheric benefit from being created.

The formula for calculating carbon reserves will be a politically delicate issue and will require considerable discussion. We suggest that the reserve carbon reflects the amount of forests in a country that are not threatened plus (or minus) the amount of forest a country agrees corresponds to their long term development objectives. Following this formulae, all forest outside the reserve would be expected to be deforested at some point in the future, making protecting these forests a reduction of future emissions. The amount could be established by using formulated international criteria, albeit taking into account national circumstances. The criteria could include:

- The amount of forest cover compared to total land area.
- The amount of forest threatened by deforestation or degradation (this criterion could take into consideration factors such as distance from current deforestation activity, distance from urban centres, species and altitude – in other words be a function of viability of deforestation and commercial value of the timber or land).
- National (sustainable) development objectives.¹³

Calculation of the total carbon stock along with the carbon pool reserve and its associated parcels of land would be communicated to an international body.

The authors recognize that establishing the reserve will be a difficult issue. However, it is not expected to be any more difficult than establishing national baselines that must take into account historic as well as future deforestation rates, or Annex I Parties’ quantified emission limitation and reduction commitments.

¹³ Special consideration can be given to countries with conflict areas if these are outside the control of the government. Special consideration can also be given to areas with indigenous rights if including such areas within a carbon reserve is problematic.

Ideally the reserve would not include areas occupied by people. However, if this does happen these people would in effect be ineligible from participating in the trading mechanism, but would have an obligation to maintain their carbon stocks without receiving any compensation under the mechanism for doing so. To overcome this, host countries may consider, if appropriate, imposing a tax on traded credits that is re-distributed to those living within the reserve.

4. Approving projects

A country that has communicated its Assigned Carbon Stock to the responsible international body and met other participation criteria¹⁴ can participate in the project-based Carbon Stock Mechanism. Under this mechanism Carbon Stock Units can be converted into tradable carbon credits provided that the corresponding forest is put under permanent protection.

Private and public entities would be eligible to develop and participate in projects. Proponents of Carbon Stock Mechanism projects must:

- Prepare a robust conservation and protection plan that describes the project's boundaries and what will be done to conserve and/or sustainably manage the forest. The plan should demonstrate stakeholder consultation and protection of the forest for a minimum period of time, such as 50 years. To continue to remain eligible to continue to generate credits, the conservation and protection plan would need to be periodically renewed.
- Obtain approval from the host country which would review the plan and other underlying documents. The host country can include additional criteria to ensure the project meets their own environmental standards and development priorities. If deemed appropriate by the host country, additional criteria can also include priorities under other international environmental law conventions such as the Convention on Biological Diversity, the Ramsar Convention, or the Convention to Combat Desertification.
- The host country or an independent entity (akin to the CDM's designated operational entity and JI's accredited independent entity) would validate the robustness of the conservation measures and the quantity of above ground carbon stock within the projects boundaries. The host country or independent

¹⁴ See section 6 below on participation criteria.

entity would forward its validation report and the amount of tCO₂e of carbon stock to the responsible international body and participants in the project.

Based on the validation and host country approval, the forest conservation project under the Carbon Stock Mechanism would be registered. Registration could be performed by the CDM Executive Board or a newly established body. Programmatic type projects should also be possible if they allow specific areas of forest be demarcated, protected, and monitored over time.

It is important to emphasise that project specific baseline methodologies are not required and approval of conservation and protection plans would be the responsibility of the host country rather than an international body. This should significantly reduce transaction costs, bottlenecks and other problems currently experienced by the CDM.

5. Issuing trade-able credits, ensuring permanence and maintaining sovereignty

Upon notification of registration, the participating host country would convert the relevant number of Carbon Stock Units into Forest Carbon Units (FCUs) which could then be transferred to the project proponents. The amount of FCUs transferred would be associated with a particular project and represent the amount of above ground biomass within the project's boundaries. The conservative approach of only issuing FCUs for above ground biomass can also offset the fact that some of the wood harvested when a forest is degraded or deforested will not instantaneously be emitted as CO₂ into the atmosphere - a proportion of the carbon will be stored for a period of time in wood products. Alternatively, subject to a decision on how account for harvested wood products, a discount can be applied to the amount of credits that are issued for trading to take this into account. FCUs would be fungible with existing carbon units and could be traded among all countries that maintain an emission register.

Unlike credits generated under a baseline and credit mechanism that accumulate slowly over time, the FCUs created under the proposed mechanism can be issued as an up-front asset to project proponents. One of the problems observed with the baseline and credit approach for CDM LULUCF projects is that the slow accumulation of credits in early years is inadequate to finance the project, and advance payments for credits not yet generated results in steep price discounts from buyers.

It is important to emphasise that the credits issued under the proposed mechanism and the credits issued under a baseline and credit mechanism have the same long term environmental credibility if the carbon reserve is set correctly¹⁵ – the only difference is one of timing of issuance. However, even though there is no long term difference between the two approaches, allowing advance credits to be used to offset emissions in Annex I countries creates “temporary hot air”. Some possible ways of dealing with this are set out in 5.3 below on timing and type of credit of issuance.

Two types of credits can in principle be issued under the Carbon Reserve Mechanism – temporary credits and permanent credits:

5.1. Temporary Crediting

Similar to the current design of LULUCF projects under the CDM, under a temporary crediting mechanism the projects will have to be periodically monitored and the FCUs (re)-verified. This verification should result in a re-issuance of the FCUs in the same way tCERs are created under the CDM.¹⁶ In contrast to the current CDM LULUF rules there would not be a mandatory replacement of the credits with “permanent” credits after a period a time (e.g. no crediting period) – a mechanism which in fact does create incentive to deforest after the artificially assigned life time of the project and the credits. As with tCERs there would be a requirement to replace credits if the corresponding carbon stock has been found to be lost during verification.

The reduced price received by project sponsors for these types of credits will be offset by the increased volume of credits available compared to a baseline and credit scenario and the timing of their availability – two key hurdles in CDM LULUCF projects. The repeated verification and issuance of credits over time also ensures an ongoing income stream to the project sponsors so long as they maintain the forest. This is of particular benefit to many rural land owners or forest dwellers in developing countries that may not have the education or resources to invest one-off payments wisely.¹⁷

¹⁵ See the example given in section 3 of the main text “Comparison with other mechanisms”.

¹⁶ An ICER system is also possible, but may not be necessary as tCERs have a number of advantages over ICERs.

¹⁷ This point is also made in Potvin C., Guay B., Pedroni L., *Implementing the mechanisms proposed to reduce emissions from deforestation and forest degradation: A case study with Panama*, forthcoming 2007.

A tFCU mechanism also provides maximum flexibility for the entity selling the credits and respects sovereign rights with respect to forests and land use, as it gives the seller the ability to sell the credits to various buyers over time.¹⁸ In contrast to a “permanent” forest credit associated with a particular piece of land that when sold would result in a potential liability and restriction on land use *ad infinitum*, temporary credits can be sold so that they give the buyer a right for the period of time between verifications (e.g. selling all the tFCUs issued in a particular verification report), or so that they give the buyer a right over a longer fixed time (e.g. selling a series of tFCUs generated over 25 years), or, if the parties choose, an indefinite period of time (e.g. all the tFCUs generated by a project).

If a tFCU expires and is not re-issued, a Party that used the tFCU for compliance would have to replace it with either another tFCU or another of the Kyoto credits. In this way, the temporary crediting mechanism also ultimately passes any liability for permanence to the Party that uses it. This would not prevent contracting parties agreeing otherwise in particular sale and purchase contracts, but on an international level it eliminates the possibility of a developing country becoming caught in a debt or liability relationship with a developed country under international law if the developing country fails to preserve its forest resources.¹⁹

5.2. *Permanent Crediting*

As a second alternative to temporary crediting it is possible for permanent credits to be issued for projects. However, like forest credits under Joint Implementation (which are also permanent) these credits would have to be backed by a government liability to maintain the stock of carbon in case of a loss. The sovereign liability may be addressed through some sort of guarantee may either take the form of i) compensating the loss through afforestation and reforestation activities, and/or ii) setting aside additional forest area normally eligible for trading but cancelling the corresponding Carbon Stock Units rather than converting them into Carbon Reserve Units, and/or iii) establishing an insurance mechanism where a portion of issued FCUs are banked and cancelled at a later date if permanence is not maintained.

¹⁸ This is not be the case in a lFCU / ICER system.

¹⁹ The issue of a loss of forest due to force majeure is discussed below.

In all three examples the liability for permanent emission reduction would rest with the host country. Each example also contains potential problems. The first example will result in a financial burden on the host country. The second option could only happen a few times – until any additional forest outside the reserve is “cancelled”. This would also place a financial burden on the host country as forest outside the reserve is under threat of deforestation, so measures would need to be taken to protect these forests and address the deforestation drivers – all at the cost of the host country. The third option is also only of limited effectiveness, as there is always a risk the insurance pool is depleted either by those forest areas forming part of the insurance being deforested, or too many claims being made against the pool.

If permanence could not be maintained under any of the above options the country would be prohibited from trading until it has reforested or afforested an area which corresponds to a larger amount than the lost area.

Aside from the issue of liability and sovereign ownership of forests, as mentioned above it is also questionable whether one-off payments to rural communities would be invested appropriately to ensure a sustainable income over time. This is not the preferred approach of the authors, but included as a possibility if temporary crediting is deemed undesirable.

5.3. Temporary Hot Air: Timing of Issuance and Types of Credits

The potential problem of “temporary hot air” can be articulated as follows: In year one of a project, the full carbon stock will be issued and available for trading as tFCUs. If the tFCUs are considered fully fungible and used for compliance purposes, they can be used to offset an emission from e.g. a coal fired power plant in an Annex I country. However, the avoided deforestation or forest degradation emission may not have actually occurred for another 10 or 20 years. In effect, the atmosphere will be worse off for that period of 10 or 20 years as emissions will continue in advance of the actual reduction.

In many respects this situation is very similar to those Annex I Parties that have higher assigned amount units (“AAUs”) than actual emissions. These Annex I Parties are able to trade their excess AAUs even though they do not correspond to actual emission reductions. Transactions of these “hot air” AAUs often require that that the AAUs are

“greened” by ensuring the income received from selling the AAUs is used to promote emission reductions or some other environmental benefits. The additional ecosystem service benefits and biodiversity conservation benefits associated with protecting the forest may be seen to be an automatic greening of the temporary hot air.

However, if the preferred approach is to look at the mechanism based on strict accounting of credits, three additional credit accounting options are presented.

Discount the amount of tFCUs initially issued. The amount of issued tFCUs could be discounted by, e.g. 20% in the first few verification periods. At the end of the project’s conservation and management plan the full amount of protected carbon should be issued.

Issue convertible options at the project start. At the project start the full amount of credits are issued as "call options" that are not eligible for using for compliance purposes. These can be sold to cover some or all of the upfront project costs. Each call option is identified with a certain year when it will be converted into a compliance grade tFCU, subject to a verification demonstrating the sufficient stock is maintained in the forest. After each verification a slice of the options are converted into compliance grade tFCUs. When an option is converted the buyer of the call option has a right to pay the project sponsor the agreed price for the corresponding tFCU, which can then be used for compliance purposes. The amount of options that are converted into tFCUs is calculated linearly so that at the end of the project conservation and management plan 100% of the options will have had the ability to be converted into compliance grade credits. For example, a 50 year project with 100 tonnes CO₂e in standing carbon, and verification every five years will be issued 100 options at the project start. Every five years up to ten options are capable of being converted into tFCUs. Five years into the project a verification finds 97tCO₂e remain. A maximum of 10 options can be converted, but only seven are converted to compliance credits as 3tCO₂e have been lost. Every tFCU is re-verified and re-issued every 5 years.

Abandon advance crediting. Finally, as a simpler variation of the previous solution, advance crediting can be abandoned and a predetermined maximum amount of tFCUs can be issued after each verification. Rather than the amount being determined against a

project specific baseline, as suggested above the amount of tFCUs able to be issued after each verification can be predetermined linearly. This solution would eliminate one of the benefits of the Carbon Stock Approach of creating funding at the start of the project to cover project implementation costs. However, it should be noted that within this solution a project sponsor can still choose to create and sell call options if they chose to do so, but this would have to be developed and issued on a project by project basis.

6. Participation Criteria.

Participation is voluntary. However, to be eligible to participate in the mechanism a country will have to put in place the necessary infrastructure. This infrastructure includes assessing the carbon stock, defining the core area of forest that is not eligible for trading, designating a national authority to approve projects²⁰, and establishing a registry system that can record issuance and transfer of Carbon Stock Units and be linked into the International Transaction Log. Annex I countries are called upon to support the development of the necessary infrastructure.

Countries that decide to participate in the Carbon Reserve Mechanism would have to communicate their compliance with the participation criteria to the responsible international body. Compliance with the mechanism would be monitored internationally.

If a country fails to maintain the agreed amount of reserve carbon or compliance with the participation criteria, the country will not be eligible to approve new projects. Existing projects already approved should still be able to have its carbon stock re-verified as individual projects or communities that are performing as planned should not be penalized by events in another part of the country outside of their control.

7. Force majeure

Forests are often subject to threats outside of the control of a country, such as accidental fires, cyclones, flooding, and changing weather patterns. Such threats could also include loss of forest from areas where there are civil disturbances and are not under the control of the central government. The loss of carbon due to these types of force majeure events should not prevent a country from meeting its commitments to maintain the reserve. If a

²⁰ For convenience this could be the DNA established for CDM projects.

country loses part of its reserve due to a force majeure event, projects should not “punished” by being prohibited from participating in the mechanism or receiving credits from their projects if they are performing.

Loss of carbon from the reserve due to a force majeure event should result in a re-assessment of the reserve area. Project proponents would not be held liable for the loss of carbon due to a force majeure event. Eligible force majeure events will need to be carefully defined in the mechanism to safeguard against deliberate acts or negligence being exempted from responsibility. The compliance committee established under the Kyoto Protocol could make the necessary determinations for any disputes over force majeure.

8. Increases in Carbon Stock

Increases in carbon stock – both within the reserve and within individual projects are likely to occur. While it may be possible to issue new credits for additional carbon sequestered, we suggest that any increases in carbon within the Carbon Stock Mechanism should be excluded from the mechanism. This serves two purposes. First, a mechanism that allows for a net *increase* in units is different to the proposed approach. It also ensures the mechanism does not compete in any way with afforestation and reforestation under the CDM, or any modified version of the CDM that may include forest restoration projects. Second, to ensure the mechanism is conservative.

The authors recognize this issue is likely to cause debate. Including increases in stock could be reviewed in the future after the mechanism has been tested and any problems with its efficacy have been identified.